

WORKPLACE SOLUTIONS

From the National Institute for Occupational Safety and Health

Preventing Slips, Trips, and Falls in Wholesale and Retail Trade Establishments

Summary

Employees in Wholesale and Retail Trade (WRT) establishments suffer high rates of slip, trip, and fall (STF) injuries. The National Institute for Occupational Safety and Health (NIOSH) recommends measures to ensure a safe workplace and prevent injuries.

Description of the Problem

WRT includes employees engaged in wholesaling merchandise—that is, preparing, distributing, and selling merchandise in retail operations, and services related to those activities. More than 21 million employees work in the wholesale and retail industries.

STFs are the second most common cause of lost-workday injuries in general industry and can cause back injuries, sprains, strains, contusions, fractures, severe head injuries, paralysis, and even fatalities. STFs are the third most common cause of lost-workday injuries in WRT establishments. Seventy-five percent of the total STF injuries in WRT occur on the same level [BLS 2010; UWSP 2010].

Slips occur as a result of low friction between the shoe and walking surface; trips occur when a person's foot contacts

an object or drops to a lower level; and falls can result from either a slip or trip [UWSP 2010].

Among other risk factors, WRT employees must frequently handle and move materials, putting them at higher risk for STF injuries. Employees in retail operations have a higher incidence rate of STF injuries than private industry employees overall. Employees in grocery stores and establishments where meat is handled are at particular risk, with a 75% greater than average industry rate for all other private industries combined (28.3 vs. 16.1 per 10,000 employees) [BLS 2010; Anderson and Mulhern 2010].

Risk Factors

The following risk factors have caused slips, trips, and same-level falls in the workplace [CDC 2011; NIOSH 2010; Anderson and Mulhern 2010; ISSA 2008; NFSI 2009; UWSP 2010]:

Workplace Factors

- **Spills on walking surfaces** may cause slippery surfaces (See Figure 1).
- **Ice, snow, or rain** can create outdoor slipping hazards and can be tracked indoors.
- **Loose mats or rugs** may result in tripping.



Figure 1. Spilled liquid on a floor that may cause slips.

- **Boxes/containers** may obstruct vision (See Figure 2).
- **Poor lighting** affects visibility.
- **Walking surfaces** that are in disrepair, have protruding nails and boards, or changes in floor height may cause STFs. Contaminants on the floor, walking surface irregularities, and tripping hazards such as clutter, cords or hoses, on walking surfaces lead to most STF injuries in the workplace.

Work Organization Factors

- **Fast work pace** can be a factor, as an employee might feel rushed and work at a faster than normal work pace, thus risking injury.



Figure 2. Carrying materials may obstruct view and cause slips, trips, and falls.

- **Work tasks** that involve handling liquid or greasy materials may cause slippery surfaces.

Individual Factors

- **Age** may affect balance, as the risk of same-level falls increases with age.
- **Employee fatigue** may contribute to slips and trips.
- **Failing eyesight/use of bifocals** may prevent employees from seeing walking surfaces clearly.
- **Inappropriate, loose, or poor-fitting footwear** may cause a worker to trip. Smooth or worn soles may cause a worker to slip.

Standards

Standards provide guidance for maintaining safe walking and working surfaces (including stairs) and preventing slip, trip, and fall hazards. These include Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.22(a) and American National Standards Institute (ANSI) standards [2006, 2007]. The National Floor Safety Institute [2009] has issued an ANSI standard on testing procedures and devices to measure the wet static coefficient of friction of common hard-surface floor materials. A static coefficient of friction measures a surface's resistance to friction, or the friction between the shoe and the floor [OBWC n.d.]

Case Studies

Several case studies were provided by the Ohio Bureau of Workers' Compensation:

- An employee was removing stacks of cardboard from a pallet. As he picked up the cardboard, he stepped back

and tripped over a pallet jack behind him (a pallet jack is used to lift and move pallets). He fell backwards, landing on his wrist, resulting in a fracture and missed work.

- A sales employee wearing sandals walked from the wet outdoors into the warehouse, slipped, and landed on an elbow, resulting in a sprained shoulder.
- An auto detailer slipped outdoors on the ice and fell on his head, suffering brain injury.

Recommendations

Most STF incidents can be prevented with proper attention to the three categories of risk factors: workplace, work organization, and individual. The following steps are recommended to prevent injuries related to slips, trips, and same-level falls.

Employers

Planning and Workplace Design

[NIOSH 2010; Anderson and Mulhern 2010; NCDOL 2010; ISSA 2008; OBWC]

- Develop a written STF prevention policy that specifies both employer and worker responsibilities. (See NIOSH 2010 for an example of developing an STF prevention plan.)
- Ensure that aisles and passageways are free of clutter and other tripping hazards.
- Provide proper lighting in all areas indoors and outdoors to reduce shadows, dark areas, and glare so that trip hazards or surface irregularities are clearly visible. Replace burnt out light bulbs promptly.
- If electrical cords are used on a regular basis, install outlets so that cords do not cross walkways.
- In grocery stores, ensure that water from produce spray misters is directed onto produce, and is not spraying onto the floor.
- In grocery stores, provide customers with plastic bags and paper towels for wet produce to prevent it from dripping water onto the floor.
- Provide clean up supplies (paper towels, absorbent material, "wet floor" signs, etc) at convenient locations in the facility.
- Provide umbrella bags to prevent rain water from dripping onto the floor.
- Select flooring material according to the work to be done in the area. Use flooring with a static coefficient of friction of more than 0.5 for high-risk areas. A higher static coefficient of friction is safer and can be increased by wearing slip-resistant shoes and keeping floor surfaces clean and dry.
- Mats are used to provide slip-resistant walking surfaces by absorbing liquid and removing dirt, debris, and liquid from shoes. Provide water-absorbent mats near entrances and other areas where water, ice, or snow may drip or be tracked onto the floor. Mats should be large enough so that several footsteps fall on the mat and clean contaminants off the shoes

before the shoes contact the flooring beyond the mat. If there is water around or beyond the mat, it means that the mat is not large enough or is saturated and needs to be replaced.

Training

[ISSA 2008]

- Train employees to identify STF hazards and how to prevent STFs by using safe cleaning procedures, including placing caution signs and/or cones around the site to warn other employees and visitors to avoid wet walking surfaces.
- Make sure employees know whom to call to report hazards and whom to call for clean-up or repair.

Footwear

[Anderson and Mulhern 2010; ISSA 2008]

- Slip-resistant shoes are an important component of a comprehensive STF prevention program. Staff that work on wet or contaminated walking surfaces should wear slip-resistant shoes.
- Choose footwear that is resistant to oil, chemicals, and heat.

Employees

Material handling

[Anderson and Mulhern 2010; UWSP 2010]

- Ensure that the walkway is unobstructed before transporting large materials that might block your vision.
- Walk with caution and make wide turns at corners.
- Push (rather than pull) carts to allow a better line of sight.

Housekeeping

[NCDOL 2010; ISSA 2008; UWSP 2010]

- Clean floors and work surfaces as soon as they become wet.
- Inspect refrigerated and freezer cases for water leakage onto the floor surfaces; place absorbent strips and water-absorbent mats on the floor until the unit is repaired.
- Place warning signs in wet floor areas and remove them promptly when the floor is clean and dry.
- Use no-skid waxes in slippery areas, and use soap that does not leave slippery residue.
- During wet or oily processes, maintain drainage and provide false floors, platforms, or nonslip mats. (False floors are elevated floors usually 2 to 4 inches above the structural floor designed to provide a surface for safe transit).
- Clean only one side of a passageway at a time to allow room for passing.
- Keep passageways clear at all times, and mark permanent aisles and passageways.
- For purposes of one-time use, tape or anchor electrical cords to floors if they cross walkways.

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References

- Anderson VP, Mulhern B [2010]. Don't let costly slip and fall injuries trip you up. *Chain Store Age March*:40–43.
- ANSI [2006]. Standards for the provision of slip resistance on walking/working surfaces. New York: American National Standards Institute, ANSI A1264.2–2006.
- ANSI [2007]. Safety requirements for workplace walking surfaces and their access: floor, wall and roof openings, stairs and guardrail systems. American National Standards Institute. ANSI/ASSE A1264.1-2007.
- BLS [2010]. Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by industry and selected events or exposures leading to injury or illness, private industry, 2010 <http://www.bls.gov/iif/oshwc/osh/case/ostb2832.pdf>
- CDC [2011]. Nonfatal occupational injuries and illnesses among older workers—United States, 2009. *MMWR* 60(16):503–508. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6016a3.htm>
- CFR. Code of Federal regulations. Washington, DC: U.S. Government Printing Office, Office of the Federal Register. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9714
- ISSA [2008]. Safety and health portal—slips, trips and falls in the workplace. Lincolnwood, IL: ISSA—The Worldwide Cleaning Industry Association. http://www.issa.com/?id=shp_slips_trips_falls_in_the_workplace
- NCDOL [2010]. Slips, trips, and falls fact sheet. Raleigh, NC: North Carolina Department of Labor Occupational Safety and Health Division. www.nclabor.com/osha/etta/A_to_Z_Topics/SlipsTrips.pdf
- NFSI [2009]. Web site of the National Floor Safety Institute. Southlake, TX: National Floor Safety Institute. http://www.nfsi.org/the_problem.php and <http://www.nfsi.org/standards.php>
- NIOSH [2010]. Slip, trip, and fall prevention for health-care workers. DHHS (NIOSH) Publication No. 2011-123. <http://www.cdc.gov/niosh/docs/2011-123/>
- OBWC [no date]. BWC Safety Grant Best Practices: reducing slip and fall injuries in restaurants: one company's experience. Columbus, OH: Ohio Bureau of Workers' Compensation.
- UWSP [2010]. Preventing injuries from slips, trips and falls. Stevens Point, WI: University of Wisconsin, Safety and Loss Control Office.

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